AMMONIUM SULPHATE, TRANZFORM GRADE 20-0-0-24S
SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product Identity: Ammonium Sulphate, Tranzform Grade 20-0-0-24S.

Trade Names and Synonyms: 20-0-0-24 Ammonium Sulfate Fertilizer, Ammonium Sulfate, $(NH_4)_2SO_4$

Manufacturer:
Teck Metals Ltd.
Trail Operations
Trail, British Columbia
V1R 4L8
Emergency Telephone: 250-364-4214

Supplier:
Teck Metals Ltd.
Trail Operations
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Preparer:
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Date of Last Review: June 28, 2018.

Date of Last Edit: May 28, 2019.

Product Use: Agricultural industry: fertilizer. Industrial applications: manufacture of specialty fertilizers.

SECTION 2. HAZARDS IDENTIFICATION

CLASSIFICATION:

Health		Physical	Environmental
Acute Toxicity (Oral, Inhalation)	– Does not meet criteria	Does not meet criteria for any Physical Hazard	Aquatic Toxicity – Short Term/Long Term Does not meet criteria
Skin Corrosion/Irritation	– Does not meet criteria		
Eye Damage/Eye Irritation	– Does not meet criteria		
Respiratory or Skin Sensitization	– Does not meet criteria		
Mutagenicity	– Does not meet criteria		
Carcinogenicity	– Does not meet criteria		
Reproductive Toxicity	– Does not meet criteria		
Specific Target Organ Toxicity			
Acute Exposure	– Does not meet criteria		
Chronic Exposure	– Does not meet criteria		

LABEL:

Symbols: None required	**Signal Word:** None required
Hazard Statements	**Precautionary Statements:**
None required	None required

Emergency Overview: Off-white granules that are stable under normal temperatures and pressures and will not burn. Relatively non-toxic in small doses, it undergoes thermal decomposition at elevated temperatures to release toxic and combustible gases such as ammonia, nitrogen oxides and sulphur oxide. The granular solid or dust is relatively non-toxic and poses little immediate hazard to the health of emergency response personnel in an emergency situation.

Potential Health Effects: This product may be slightly irritating to the eyes and skin upon prolonged or repeated contact. Over-exposure by inhalation may cause mild respiratory tract irritation. Ingestion of large amounts of this substance may produce irritation of the gastro-intestinal tract, characterized by burning and diarrhea. Small amounts are unlikely to cause any toxic effects. Ingredients of this material are not listed as human carcinogens by ACGIH, IARC, OSHA, NTP or the EU (see Toxicological Information, Section 11).

Potential Environmental Effects: This product is highly soluble in water but has limited direct toxicity to organisms living in aquatic and terrestrial environments. The exception to this is in circumstances where elevated zinc concentrations may develop. However, when dissolved in water, this product can release free ammonia, which, at elevated concentrations, can be toxic to fish and other aquatic organisms.

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	CAS Registry No.	CONCENTRATION (% wt/wt)
Ammonium Sulphate	7783-20-2	97%
Zinc Sulphate Monohydrate	7446-19-7	3%

Note: See Section 8 for Occupational Exposure Guidelines.

SECTION 4. FIRST AID MEASURES

Eye Contact: *Symptoms:* Mild eye irritation, redness. If irritation occurs, flush the contaminated eye(s) with lukewarm, gently flowing water for 5 minutes, while holding the eyelid(s) open. If eye irritation persists, get medical advice/attention.

Skin Contact: *Symptoms:* Skin soiling. No health effects expected. If irritation does occur, flush with lukewarm, gently flowing water for 5 minutes or until the material is removed. If irritation persists or you feel unwell, get medical advice/attention.

Inhalation: *Symptoms:* Coughing or irritation of nose and throat in heavy dust clouds. If symptoms are experienced move from exposure area to fresh air. Get medical advice/attention if you feel unwell or are concerned.

Ingestion: *Symptoms:* Stomach upset, diarrhea. Rinse mouth. If irritation or discomfort occurs, get medical advice/attention.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Product is not considered a fire or explosion hazard. However, it has been reported to enhance the explosive properties of ammonium nitrate when they are mixed together in the right proportions.

Extinguishing Media: Use any means of extinction appropriate for surrounding fire conditions such as water spray, carbon dioxide, dry chemical or foam. Cool any containers that are exposed to heat or flames by the application of water streams until well after the fire has been extinguished.

Fire Fighting: This material will not burn. However, it may undergo thermal decomposition at temperatures above approximately 250°C to release toxic and combustible gases such as ammonia, nitrogen oxides and sulphur oxides. Firefighters must wear full protective clothing and an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask. Do not allow water run-off to enter sewers or watercourses.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of release if possible to do so safely. Clean up spilled material immediately observing precautions in Section 8, Personal Protection. Granules and dust should be cleaned up using methods that will minimize dust generation (e.g., vacuum solids or dampen material and wet sweep/shovel, etc.). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable containers for later recovery or disposal. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

Personal Precautions: Protective clothing, gloves, and a respirator are recommended for persons responding to an accidental release (see also Section 8). Close-fitting safety goggles may also be necessary in some circumstances to prevent eye contact with fertilizer dust.

Environmental Precautions: This product may pose a threat to the environment. Do not allow spills or water run-off from storage area to enter sewers or watercourses.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling: Avoid unnecessary contact with skin and eyes. Avoid generating dust and the release of dust into the workplace. Good housekeeping is important to prevent accumulations of dust.

Conditions for Safe Storage: Store in a dry, cool, well-ventilated area. Keep away from incompatible materials.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Guidelines:

Component	ACGIH TLV	OSHA PEL	NIOSH REL
Ammonium Sulphate	(see note below)	(see note below)	None established
Zinc Sulphate Monohydrate	(see note below)	(see note below)	None established

NOTE: OEGs for individual jurisdictions may differ from those given above. Check with local authorities for the applicable OEGs in your jurisdiction.
ACGIH - American Conference of Governmental Industrial Hygienists; OSHA - Occupational Safety and Health Administration; NIOSH - National Institute for Occupational Safety and Health. TLV – Threshold Limit Value, PEL – Permissible Exposure Limit, REL – Recommended Exposure Limit.

ACGIH® TLV® - ACGIH® believes that even biologically inert, insoluble, or poorly soluble particles may have adverse effects and recommends that airborne concentrations should be kept below 3 mg/m^3 respirable particles and 10 mg/m^3 inhalable particles, until such time as a TLV® is set for a particular substance. While ammonium sulphate does not completely meet the ACGIH® definition of a Particle Not Otherwise Specified (PNOS) due to its high solubility, this is still considered to be a valid guideline for ammonium sulphate fertilizer dust.

OSHA PEL – All inert or nuisance dusts, whether mineral, inorganic, or organic not listed specifically by substance name in Tables Z-1 or Z-3 of CFR 1910.1000 are covered by the Particulates Not Otherwise Regulated (PNOR) limit of 15 mg/m^3 total dust and 5 mg/m^3 respirable fraction.

NOTE: The selection of the necessary level of engineering controls and personal protective equipment will vary depending upon the conditions of use and the potential for exposure. The following are therefore only general guidelines that may not fit all circumstances. Control measures to consider include:

Ventilation: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure guidelines. If user operations generate dust, use ventilation to keep exposure to airborne contaminants below the exposure guidelines.

Protective Clothing: The hazard potential of this material is low. Where there is large scale use of this material with significant potential for worker contact, long-sleeved clothing or coveralls, chemical resistant gloves, and/or safety glasses with side shields may be necessary.

Respirators: Where dust is generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-95 particulate filter cartridge respirator or an N-95 filtering face piece respirator/disposable dust mask).

General Hygiene Considerations: Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate designated areas. Keep out of reach of children.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:
Solid off-white granules

Odour:
Odourless

Odour Threshold:
Not Applicable

pH:
6.5-7.5 (10% sol'n in water)

Vapour Pressure:
Not Applicable

Vapour Density:
Not Applicable

Melting Point/Range:
Decomposes above 235°C

Boiling Point/Range:
Not Applicable

Relative Density (Water = 1)**:**
0.913 (Water = 1)

Evaporation Rate:
Not Applicable

Coefficient of Water/Oil Distribution:
Log P (oct) = -5.1 @ 25°C

Solubility:
Highly soluble, 76g/100 gm of water at 20°C

Bulk Density:

Loose: 865 kg/m^3;
Packed: 910 kg/m^3

Flash Point:
Not Flammable

Flammable Limits (LEL/UEL):
Not Applicable

Auto-ignition Temperature:
Not Applicable

Decomposition Temperature:
Decomposition begins between 150 and 280°C

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: This material is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur.

Incompatibilities: Reactive with oxidizing agents, metals and alkalis. Corrosive to copper alloys such as brass, ferrous metal and their alloys and to 314 stainless steel. Slightly corrosive to 302 and 304 stainless steel. Non-corrosive to 316 stainless steel.

Hazardous Decomposition Products: Upon heating to decomposition, ammonia, nitrogen oxides and/or sulphur oxides may be generated.

SECTION 11. TOXICOLOGICAL INFORMATION

General: In the form in which this product is sold it is relatively non-toxic. The major route of exposure would be through the generation and inhalation of airborne dust.

Acute:
Skin/Eye: This product may be mildly irritating to the eyes and skin upon prolonged or repeated contact but would not cause tissue damage.

Inhalation: Over-exposure by inhalation may cause respiratory tract irritation.

Ingestion: Ingestion of small quantities of ammonium sulphate fertilizer is unlikely to cause a toxic effect. The ingestion of large amounts of this substance may produce irritation of the gastro-intestinal tract, characterized by burning and diarrhea.

Chronic: Neither ammonium sulphate nor zinc sulphate monohydrate is considered a human carcinogen by the American Conference of Governmental Industrial Hygienists (ACGIH), the International Agency for Research on Cancer (IARC), the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP) or the European Union (EU).

Animal Toxicity:

Hazardous Ingredient:	Acute Oral Toxicity:	Acute Dermal Toxicity:	Acute Inhalation Toxicity:
Ammonium Sulphate	4,540 mg/kg†	>2,000 mg/kg*	>1800 mg/m^3‡
Zinc Sulphate Monohydrate	1,538 mg/kg	No data	No data

† LD_{50}, Rat,Oral, * LD_{50}, Rat, Dermal ‡ LC_{50}, Guinea Pig, Inhalation, 4 hour

SECTION 12. ECOLOGICAL INFORMATION

While this product is highly soluble in water, it has limited direct toxicity to most organisms living in aquatic and terrestrial environments. The exception to this is in circumstances where elevated zinc concentrations may develop. However, when dissolved in water, the product can release free ammonia, which, at elevated concentrations, can be toxic to fish and other aquatic organisms. Toxic thresholds are dependent on pH. In addition, when present in slow-moving watercourses, the product can promote algal growth, which may, in turn, degrade water quality. The product can also, if ingested, be harmful to livestock and wildlife.

The zinc content of this product is directly bioavailable and may be toxic to aquatic organisms, especially fish. Water hardness, pH and dissolved organic carbon content are significant regulating factors. In terrestrial environments, chemical conditions of the soil can regulate the degree of zinc mobility and bioaccumulation in organisms.

SECTION 13. DISPOSAL CONSIDERATIONS

Do not wash down drain. Recover and place material in a suitable container for intended use or disposal. Ensure disposal complies with government requirements and local regulations.

SECTION 14. TRANSPORT INFORMATION

Proper Shipping Name under Transport Canada and U.S. DOT..... Not regulated.
Hazard Classification Transport Canada and U.S. DOT ..... Not controlled under TDG (Canada) or DOT (USA)
Product Identification Number..... Not applicable.
Marine Pollutant ..... No

SECTION 15. REGULATORY INFORMATION

U.S.

Listed on TSCA Inventory ..... Yes
Hazardous under OSHA Hazard Communication Standard..... No
CERCLA Section 103 Hazardous Substance ..... Zinc Sulfate.....RQ: 1,000lbs.
EPCRA Section 302 Extremely Hazardous Substance..... No ingredients qualify
EPCRA Section 312 Hazard Categories..... None
EPCRA Section 313 Toxic Release Inventory (Supplier Notification) ..... Ammonium Sulfate (Solution)
CAS No. 7783-20-2 .....Percent by Weight: 97%
Zinc Compounds (Zinc Sulfate)
CAS No. 7446-19-7 .....Percent by Weight 3%

Canada:

Listed on the Domestic Substances List ..... Yes

SECTION 16. OTHER INFORMATION

Date of Original Issue: May 28, 2012 **Version:** 01 *(First edition)*

Date of Latest Revision: May 28, 2019 **Version:** 04

The information in this Safety Data Sheet is based on the following references:

- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Exposure Indices, 7th Edition plus updates.
- American Conference of Governmental Industrial Hygienists, 2018, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, 2018, Guide to Occupational Exposure Values.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition (P. G. Urben, Ed.) 1995.
- Canadian Centre for Occupational Health and Safety (CCOHS), CHEMINFO Record No. 4242 – Ammonium Sulfate.
- Commission de la santé et la sécurité du travail, Service du répertoire toxicologique, Sulfate d'ammonium, 2000-07.
- European Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures, amending and repealing directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (REACH).
- European Fertilizer Manufacturers Association, Guidance for the Compilation of Safety Data Sheets for Fertilizer Materials – Ammonium Sulphate (http:www.efma.org/publications/guidance/section10.asp).
- Health Canada, SOR/2015-17, Hazardous Products Regulations, 11 February 2015.
- International Agency for Research on Cancer (IARC), Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, 1972 – present, (multi-volume work), World Health Organization, Geneva.
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- The Engineering Toolbox, Metals and Corrosion Resistance (www.engineeringtoolbox.com/metal-corrosion-resistance-d_491.html).
- U.S. National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank (HSDB) (on-line). U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, National Toxicology Program (NTP), 14th Report on Carcinogens, November 3, 2016.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances (RTECS).
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

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